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10/676,335	10/01/2003	Fredrik Solhage	ANO 6277 US1/3166DIV	6520

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EXAMINER	
CORDRAY, DENNIS R	
ART UNIT	**PAPER NUMBER**
1731	

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05/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/676,335	SOLHAGE ET AL.	
	Examiner	Art Unit	
	Dennis Cordray	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *16-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15 and 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's amendments, filed 3/6/2007, have failed to overcome the disclosures of the cited prior art. However, the rejections have been amended to include the amended subject matter. Applicant's arguments Applicant's arguments have been fully considered but they are not persuasive.

In addition, a new rejection is presented in response to the amendments.

Applicant argues that Persson et al does not disclose a polysaccharide having a cationic or anionic substituents having an aromatic group and a second substituent having no aromatic group with the claimed molar ratio of first and second substituents.

Persson et al recites that, "The polysaccharide is a hydrophobic substituted, cationic or amphoteric polysaccharide, i.e. a polysaccharide having one or more hydrophobic groups and one of more cationic groups," with the cationic groups preferably being quaternary ammonium groups (page 3, lines 9-12). It is clear that polysaccharides comprising substituents having hydrophobic groups (such as aromatic groups) and other substituents having quaternary ammonium groups and no hydrophobic groups (no aromatic groups) were envisioned as embodiments of Persson et al.

Persson et al claims the use of polysaccharides modified with both ionic aromatic-containing substituents and non-aromatic substituents in claims 1, 2, 5, 6, 9 and 10. An amphoteric polysaccharide containing aromatic hydrophobic groups on charged nitrogen atoms, quaternary ammonium groups and anionic groups is claimed.

Persson et al discloses that the cationic polysaccharide can have anionic substituents as well, preferably phosphate groups, which are non-aromatic (page 3, lines 12-14; page 4, lines 24-29). The degree of cationic substitution (DS_C) ranges from 0.01 to 5, with a preferred range of 0.025 to 0.2, corresponding to a cationic charge density of 0.03 to 6 meq/g, or a preferred range of about 0.15 to about 1.23. The degree of aromatic substitution (DS_{Ar}) is from 0.01 to 0.5, with a preferred range of 0.025 to 0.2, and the degree of anionic substitution (DS_A) is from 0 to 0.2, with a preferred range of 0 to 0.05. Using the disclosed ranges DS_C, DS_{Ar} and DS_A, the molar ratio of substituents having an aromatic group to cationic or anionic substituents having no aromatic group can be from 1:50 to 70:1 using the broader limits and from 1:8 to 8:1 using the preferred limits, which substantially overlaps the claimed ranges.

Regarding the arguments on p 7, 3rd par concerning cited embodiments of Persson et al wherein the polysaccharide is modified with a non-ionic aromatic substituent, such as benzyl chloride, the Examiner agrees that the substituent is not cationic or anionic and the particular embodiment is not used in the current rejections. However, as indicated in the previous Office Action, Persson et al also recites, in the same paragraph, that a suitable cationic modifying agent is N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl ammonium chloride (page 5, lines 2-17). As discussed in the previous paragraph, anionic substituents can also be present, thus both ionic aromatic-containing and non-aromatic substituents are disclosed.

Regarding the unexpected results, the only aromatic-containing substituent recited in the comparisons is N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl

ammonium chloride, which is specifically disclosed by Persson et al as a particularly suitable modifying agent for polysaccharide (page 5, lines 15-16). Persson et al also uses the same modifying agent in examples (page 11, lines 17-25). The data in the instant Specification may support the usage of N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl ammonium chloride and 2,3-epoxypropyl trimethyl ammonium chloride as modifying agents in various ratios as opposed to either one of the two agents alone. However, there is no evidentiary support for the general recitation of a cationic or anionic aromatic containing substituent and a non-aromatic substituent.

A similar response is offered with regard to the arguments against Lindgren et al, which has a similar but not identical disclosure to that of Persson et al. As detailed in the rejections, Lindgren et al discloses that the polysaccharide can also have anionic substituents and the amounts of cationic, aromatic and anionic substituents is the same as for person et al. N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl ammonium chloride is disclosed (col 9, lines 14-39). The embodiment wherein the aromatic containing modifying agent is benzyl chloride has been eliminated from the rejection as being inapplicable to the amended claims.

Claim Rejections - 35 USC § 102

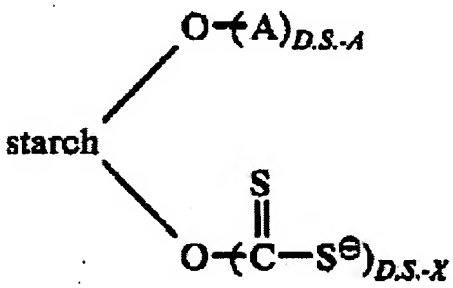
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

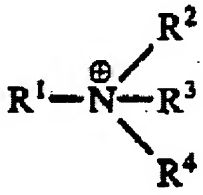
> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Carr (4093510).

Carr discloses a process for making paper from an aqueous suspension containing cellulosic fibers that comprises adding to the suspension a cationized polysaccharide (col 8, lines 7-13). The polysaccharide is an amphoteric starch derivative having the structure



, wherein A is 

R^1 is a C_1-C_6 alkylene or a hydroxyl substituted alkylene; R^2, R^3 and R^4 are independently H, a C_1-C_{12} alkyl, cyclohexyl, phenyl or benzyl; D.S.-A and D.S.-X are the degree of substitution of the amine and xanthate group respectively (col 2, lines 42-65). Thus, in some embodiments, the polysaccharide has a cationic substituent having an aromatic group (e.g. phenyl) and a substituent having no aromatic group. The value of D.S.-A is from 0.01 to 0.35 and for D.S.-X, 0.002 to 0.35 (col 4, lines 35-44). The disclosed cationic charge density can be calculated (using a molecular weight for the polysaccharide repeating unit of 162) to be from about 0.06 to 1.5. The ratio of D.S.-A

to D.S.-X, which represents the molar ratio of aromatic substituents to non-aromatic is generally from 1.2:5 to 5:1 (col 4,lines 62-63). The composition of Carr significantly overlays the claimed composition.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-10, 13-15 and 31 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as unpatentable over Persson et al (WO 99/55964).

Persson et al discloses a process for producing paper from an aqueous suspension containing cellulosic fibers, and optional fillers, which comprises adding to the suspension a sizing dispersion containing a cationic polysaccharide having substituents with hydrophobic groups, which can be aromatic groups, and can additionally have substituents with nonaromatic cationic or anionic groups (page 2, lines 2-5; page 3, line 26 to page 4, line 23). The hydrophobic group is "preferably a group selected from an alkyl or aralkyl group, e.g. benzyl and phenylethyl groups" (page 4, lines 17-20). Thus aromatic groups in particular are recited. Forming and dewatering the suspension on a wire is disclosed (page 2, lines 9-10).

The cationic polysaccharide is preferably a starch or guar gum (page 2, lines 30-31). The polysaccharide can be cationized using cationic agents (second substituent) known in the art (page 4, line 34 to page 5, line 2; page 5 lines 17-24), such as those disclosed in US Patent No. 5463127 (the teachings of which were incorporated by reference), which teaches in col 1, lines 7-10 that "Halohydroxypropyltrialkylammonium halides are known to be useful as intermediates used in modification of natural and synthetic polymers, particularly in production of cationic polysaccharides, e.g. starch." The aromatic group can be added by a cationizing species of the general structural formula (I), such as N-dialkyl-N-aralkyl ammonium halide or N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl ammonium chloride (page 5, lines 2-17). The latter species contains the claimed benzyl group. Thus, in some embodiments, the polysaccharide comprises or, at least, it would have been obvious to one of ordinary skill in the art that the polysaccharide comprises cationic benzyl containing substituents and halohydroxypropyltrialkylammonium substituents (non-aromatic) and nonionic substituents (non-aromatic).

Alternatively, Persson et al claims the use of polysaccharides modified both with ionic aromatic containing substituents and non-aromatic substituents. An amphoteric polysaccharide containing aromatic hydrophobic groups on charged nitrogen atoms, quaternary ammonium groups and anionic groups is claimed (claims 1, 2, 5, 6, 9 and 10).

The cationic polysaccharide can have anionic substituents (page 4, lines 24-29). The degree of cationic substitution (DS_C) ranges from 0.01 to 5, with a preferred range

of 0.025 to 0.2, corresponding to a cationic charge density of 0.03 to 6 meq/g, or a preferred range of about 0.15 to about 1.23 (calculated using a molecular weight for the polysaccharide of 162), the disclosed ranges encompassing the claimed range for the broader limits and lying within the claimed range for the preferred limits. The degree of aromatic substitution (DS_{Ar}) can be from 0.01 to 0.5, with a preferred range of 0.025 to 0.2, and the degree of anionic substitution (DS_A) can be from 0 to 0.2, with a preferred range of 0 to 0.05. Using the disclosed ranges DS_C, DS_{Ar} and DS_A, the molar ratio of substituents having an aromatic group to cationic or anionic substituents having no aromatic group can be from 1:50 to 70:1 using the broader limits and from 1:8 to 8:1 using the preferred limits, which substantially overlaps the claimed ranges.

Persson et al discloses the papermaking process further comprising recirculating the white water and adding fresh water up to 30 tons of fresh water per ton of dry paper produced (page 10, lines 5-7).

Persson et al discloses that an anionic material may be added, and that the anionic material can include silica based particles and clays of the smectite type (page 5, lines 25-33 and page 6, lines 7-8). Persson et al further discloses that the anionic material can be silica based particles with a specific surface area from 50 – 1000 m^2/g and which are present in a sol having an S value of 8 - 45% (page 6, lines 31-36). The ranges for surface area and sol S value significantly overlap and thus anticipate the claimed ranges.

Persson et al discloses adding a synthetic low molecular weight cationic polymer, which can be a polyacrylamide (page 7, lines 32-36 and page 8, lines 1-5)

The substituent having a non aromatic group of instant Claim 6 is not expressly disclosed by Persson et al. However, person et al teaches in the background section that 3-chloro-2-hydroxypropyl trimethylammonium chloride is a known quaternizing agent for polysaccharides (page 1, lines 23-25), thus would have been an obvious cationizing agent to one of ordinary skill in the art.

4. Claims 1-9, 11-15 and 31 are rejected under 35 U.S.C. 102 (a or e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lindgren et al (6818100).

Lindgren et al discloses a process for producing paper from an aqueous suspension containing cellulosic fibers, and optional fillers, which comprises adding to the suspension a sizing dispersion containing a cationic polysaccharide having substituents with an aromatic group, and can additionally have substituents with nonaromatic cationic or anionic groups (Abs; col 4, lines 33-41; col 8, line 19 to col 9, line 5). The aromatic group is "suitably an aromatic hydrocarbon group, including aralkyl groups, e.g. benzyl and phenylethyl groups" (col 8, lines 56-58). Forming and dewatering the suspension on a wire is a standard papermaking process and would be inherent or at least obvious to one of ordinary skill in the art.

The cationic polysaccharide is preferably a starch or guar gum (col 7, lines 54-64). The polysaccharide can be cationized using cationic agents (second substituent) known in the art (col 9, lines 14-16 and 40-51), such as those disclosed in US Patent No. 5463127 (the teachings of which were incorporated by reference), which teaches in col 1, lines 7-10 that "Halohydroxypropyltrialkylammonium halides are known to be

useful as intermediates used in modification of natural and synthetic polymers, particularly in production of cationic polysaccharides, e.g. starch." The aromatic group can be added by a cationizing species of the general structural formula (I), such as N-dialkyl-N-aralkyl ammonium halide or N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl ammonium chloride (col 9, lines 14-39). The latter species contains the claimed benzyl group. Thus, in some embodiments, the polysaccharide comprises or, at least, it would have been obvious to one of ordinary skill in the art that the polysaccharide comprises cationic benzyl containing substituents and halohydroxypropyltrialkylammonium substituents (non-aromatic) and nonionic substituents (non-aromatic).

The cationic polysaccharide can have anionic substituents. The degree of cationic substitution (DS_C) ranges from 0.01 to 5, with a preferred range of 0.025 to 0.2, corresponding to a cationic charge density of 0.03 to 6 meq/g, or a preferred range of about 0.15 to about 1.23 (calculated using a molecular weight for the polysaccharide of 162), the disclosed ranges encompassing the claimed range for the broader limits and lying within the claimed range for the preferred limits. The degree of aromatic substitution (DS_{Ar}) can be from 0.01 to 0.5, with a preferred range of 0.025 to 0.2, and the degree of anionic substitution (DS_A) can be from 0 to 0.2, with a preferred range of 0 to 0.05 (col 8,line 64 to col 9, line 5). Using the disclosed ranges DS_C, DS_{Ar} and DS_A, the molar ratio of substituents having an aromatic group to cationic or anionic substituents having no aromatic group can be from 1:50 to 70:1 using the broader limits

and from 1:8 to 8:1 using the preferred limits, which substantially overlaps the claimed ranges.

A second cationic polymer can be added as a sizing promoter, and can be a cationic polyacrylamide (col 7, line 54 to col 8, line 5). In a preferred embodiment, an anionic polymer, which can be an organic step growth polymer that is a naphthalene sulfonate, can also added as part of the sizing dispersion (col 6, line 62 to col 7, line 2; col 12, lines 45-50). Other materials that can be added are anionic clays of the smectite type, anionic silica based particles, and low molecular weight organic polymers (col 14, lines 47-58). The process comprises recirculating white water and introducing fresh water in an amount of less than 30 tonnes per tonne of dry paper produced (col 15, lines 29-42).

N-(3-chloro-2-hydroxypropyl-N-benzyl)-N,N-dimethylammonium chloride is recited as a particular material for introducing the aromatic group to the polysaccharide and corresponds to one of the substituents of Claim 6. The other substituent in Claim 6 is not expressly disclosed by Lindgren et al, but is encompassed by the general disclosure of a halohydroxypropyl trialkylammonium halide (col 9, lines 26-27) and would have been obvious to one of ordinary skill in the art as a functional equivalent.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lindgren et al in view of Persson et al (WO 99/55964).

Lindgren does not disclose the surface area or S-value of the silica based particles.

Persson et al discloses a process comprising similar polymers and anionic silica based particles with a specific surface area from 50 – 1000 m^2/g and which are present in a sol having an S value of 8 - 45%(page 6, lines 31-36). The ranges for surface area and sol S value significantly overlap and thus anticipate the claimed ranges.

The art of Lindgren et al, Persson et al and the instant invention is analogous as pertaining to the addition of cationic polysaccharides containing both aromatic and non-aromatic substituents to a papermaking suspension. Due to the similarity of the processes of Persson et to and Lindgren et al, it would have been obvious to one of ordinary skill in the art to obtain the claimed values for the surface area and S-value of the silica based particles in the process or Lindgren et al in view of Persson et al as a functionally equivalent option.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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